Reasoning Systems

Course Manager: GU Zhan (Sam)

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Course Manager/Co-lecturer

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Mr. GU Zhan 顾瞻 (Sam) lectures Master of Technology programme in the areas of data science, machine intelligence, and soft computing. Prior to joining ISS, he was in New Zealand running start-up, delivering artificial intelligence training programs. Sam had also spent many years in financial and engineering sector wearing versatile hats: data scientist, project manager, consultant, system manager and software engineer.

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Course Co-lecturer (IS Program Chief)

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Dr. ZHU Fangming is with the Institute of Systems Science of the National University of Singapore (NUS-ISS). He currently lectures in the Master of Technology programme in the areas of evolutionary computation, neural networks and data mining. Prior to joining ISS, he was a postdoctoral fellow in the Department of Electrical and Computer Engineering at NUS. He also worked as a research and development engineer in an IT company before pursuing his PhD studies at NUS.

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Course Co-lecturer

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Dr. Barry Adrian SHEPHERD teaches Business Analytics, Data Mining and Knowledge Engineering at ISS and has over 30 years experience in these areas. Before joining ISS he was based in the US and specialized in web analytics and user response modeling for online ad targeting at Microsoft Display Advertising and in process optimization and data analytics for ecommerce order fulfillment at Amazon.com.

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Learning Outcomes

1. **Identify** real world business use cases and applications of advanced intelligent reasoning systems.
2. **Integrate** advanced technical enablers in reasoning systems, including uniformed search, heuristic search, constraint satisfaction, simulation assisted learning, optimization, planning, system integration, programming, and data mining for knowledge discovery.
3. **Decompose** complex application scenarios into sub problems to be solved by assembling cooperative intelligent subsystems.
4. **Reflect** the architectures and techniques used in contemporary reasoning systems.
5. **Design** cooperative reasoning modules based on decomposed business outcomes.
6. **Create** hybrid reasoning system by applying suitable techniques and computer programming to solve complex problem under constraints.

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Agenda

Day 1

1.1 Reasoning Systems Overview

1.2 Reasoning Using Uninformed Search

1.3 Search Representation **Workshop**

Day 2

2.1 Reasoning Using Informed Search

2.2 Search Based Reasoning Applications

2.3 Search Reasoning **Workshop**

Day 3

3.1 Reasoning using Optimization Techniques

3.2 Optimization Based Intelligent Systems (GA)

3.3 Optimisation Reasoning **Workshop**

Day 4

4.1 Reasoning and Knowledge Discovery from Large Datasets

4.2 Market Basket Analysis and Recommender Systems & **Workshop**

4.3 Similarity-based Recommender Systems & **Workshop**

Day 5

5.1 Model-based Recommender Systems & **Workshop**

5.2 Hybrid and Advanced Recommender Systems

5.3 Hybrid Recommender Systems **Workshop**

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Agenda : Course Assessment & Grading

- **In-Class Workshops [Individual]** **to be advised by co-lecturers**

- **Project Work [Group]**
  - Refer to Practice Module if applicable

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Agenda : Course Assessment & Grading

In-Class Workshops

[In-Class Workshops Submission]

- Deliverables in a single zip file
- Naming convention:
    1. A zip file (individual) : ***ID_FullName_DayX.zip*** e.g. ***A1234567B_Gu Zhan_Day3.zip***
- Upload to NUS (Canvas) respective submission folders.

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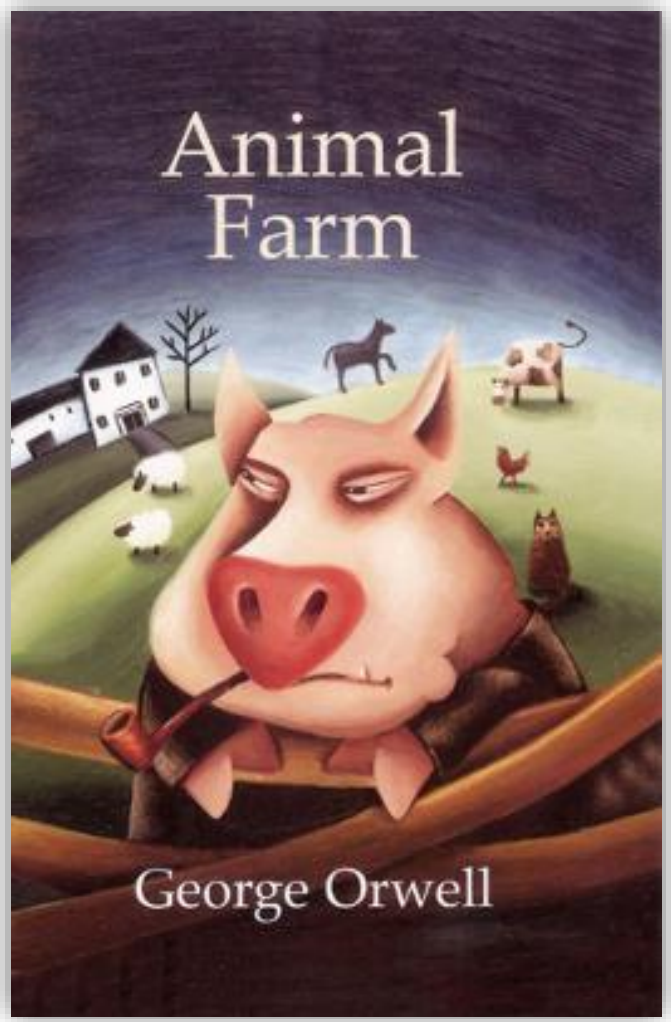
[Your Action Required] Reasoning System: Corpus for Knowledge Graph

Your actions before RS day 1 reasoning systems class:

- **Read short fiction <Animal Farm> by George Orwell if you haven't read yet.**
- **For example, online source like this.**



Source
https://d1w7fb2mkkr3kw.cloudfront.net/assets/images/book/lrg/9780/5824/9780582434479.jpg

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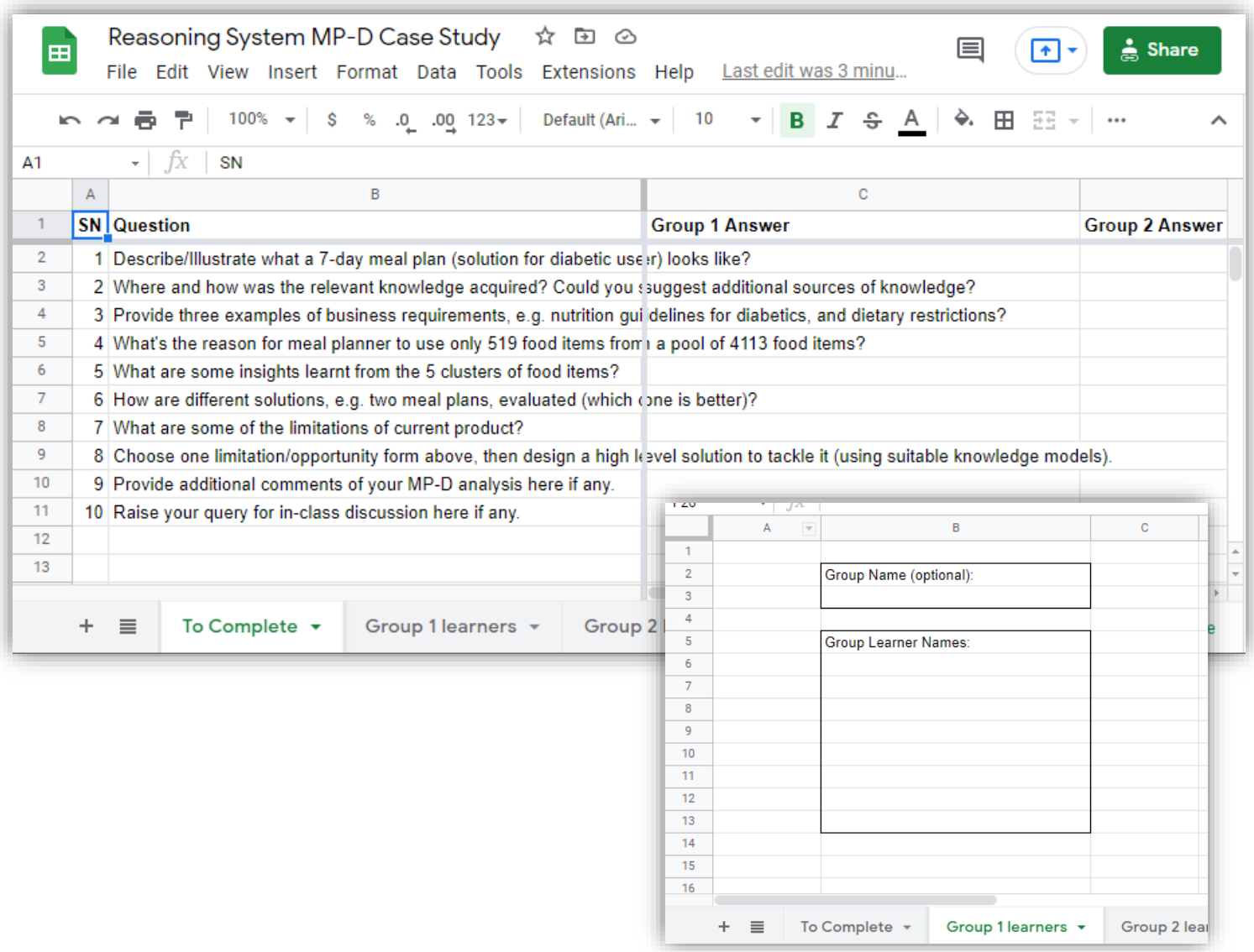
[Your Action Required] Reasoning System: Meal Planner for Diabetics (MP-D)

Your actions before RS day 2 reasoning systems class:

- **Form a learner group of 3~4 persons;**
- **Watch demo video.**
- **Read & analyze Meal Planner at this repository.**
- **Answer all the questions here as a group: update sheet of <To Complete> & <Group N learners>.**



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Fire Evacuation

Upon hearing the second announcement on evacuation, staff and students are to follow the guidelines stated below:

DO:

- Evacuate immediately.
- Exit from the building using the nearest exit staircase – look out for this overhead EXIT sign to locate the exit staircases.
- Do not panic. Walk quickly and orderly down the staircase.
- Proceed to the primary assembly point - Carpark in front of I-Cube (I^3) entrance.
- Your attendance will be taken by the fire warden.

DO NOT:

- Bring any belongings with you (bags, files, etc.).
- Use the lift as it will be de-activated upon the fire alarm trigger.
- Re-enter the building unless otherwise instructed by the Fire Safety Coordinator or SCDF Officer.

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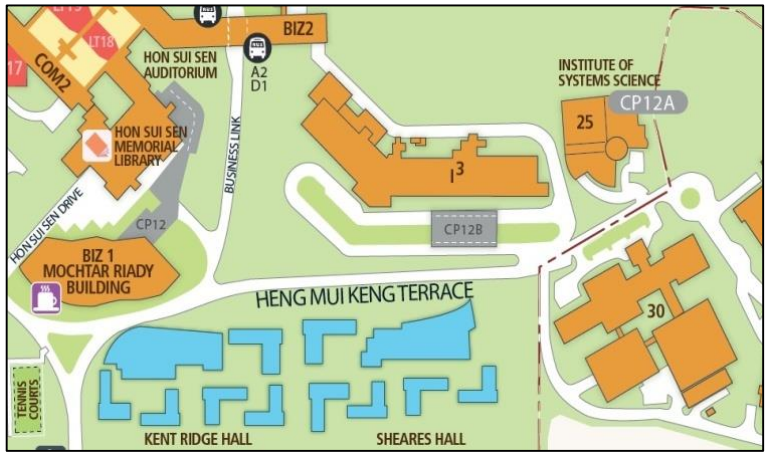
Fire Evacuation

Primary assembly point - Carpark in front of I-Cube (I3) entrance



In the event that the primary assembly point is not available, staff and students are to proceed immediately to the secondary assembly point - Carpark in front of Hon Sui Sen Memorial Library (NUS Business School).

END OF NOTES

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